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present in all the gymnosperms except the Taxineae, among which it is almost entirely eliminated.[4]

The features in which Phyllocladus resembles the Taxineae and differs from the Podocarpineae are as follows:

1. The ovule is erect; in the Podocarpineae it is more or less inverted, except in *Dacrydium latifolium.*

2. The cladodes contain centripetal wood, according to Miss ROBERTSON (*l. c.*). WORSDELL[5] states that centripetal wood is more common among the Taxineae than in any other group of Coniferales; it has been found in the leaf and cotyledon of Taxus and Cephalotaxus, in the cotyledon of Torreya,[6] and in the stem of *Cephalotaxus koraiana.*[7]

3. The arillus of Phyllocladus originates at the base of the ovule, just as does that of Taxus; the so-called epimatium (PILGER, *l. c.*) of Podocarpus arises from the scale. If this epimatium represents the arillus of Phyllocladus and Taxus, it differs in origin and form; if it does not represent the arillus, it is a structure not found in those genera.

These comparisons indicate that in number and in importance the features of Phyllocladus in common with those of Podocarpineae are much greater than those in common with Taxineae. The winged microspores and the multicellular and evanescent prothallial tissue alone would seem to be of sufficient importance to associate Phyllocladus with the Podocarpineae. We are inclined, therefore, to assign Phyllocladus to the Podocarpineae, thus confirming STRASBURGER'S conclusion of 1872; and not to regard it as referable to Taxineae, or as worthy of constituting a distinct group.—N. JOHANNA KILDAHL, *The University of Chicago.*

NOTE ON THE POLLEN OF MICROCACHRYS

NORÉN[8] has recently described certain of the reproductive features of Saxegothaea. He found that the microspore, like that of the other podocarps recently described, has supernumerary prothallial cells. Unlike the other forms, however, the grains are not winged. In connection with the deposition of the pollen there is a very interesting condition. Sometimes the pollen falls in the micropyle, and sometimes in the cavity around the ovule, whence it grows over the tissues into the micropyle. This recalls the condition of affairs in the Araucarieae, and is essentially similar in this respect to Agathis, as I have found it.

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[4] THOMSON, R. B., The megaspore membrane of the gymnosperms. Univ. Toronto Biol. Series, no. 4. 1905.

[5] WORSDELL, W. C., On transfusion tissue; its origin and function in the leaves of gymnospermous plants. Trans. Linn. Soc. Bot. London II. **5**:301–319. *pls. 23–26.*

[6] CHICK, EDITH, The seedling of *Torreya myristica.* New Phytol. **2**:83. 1903.

[7] ROTHERT, W., Ueber parenchymatische Tracheiden und Harzgänge im Mark von Cephalotaxus-Arten. Ber. Deutsch. Bot. Gesells. **17**:275, 1899.

[8] NORÉN, C. O., Zur Kenntnis der Entwicklung von *Saxegothaea conspicua* Lindl. Svensk. Bot. Tidskr. **2**:101–122. *pls. 7–9.* 1908.

In the pollen of Microcachrys there is a similar excess of prothallial tissue. The grain has wings, however, but not of so definite a character as those of Dacrydium and Podocarpus, which, as is commonly known, bear two well-developed floating appendages. In Microcachrys a large percentage of the grains have three rather poorly developed wings, though the greater number are of the type which is characteristic of the higher members of the group. The winging of the grain is, as it were, in its experimental condition in Microcachrys, and the form is to be considered in this respect as a transitional one between Saxegothaea on the one hand and Dacrydium and Podocarpus on the other.

Attention has often been directed to the biwinged condition of the pollen of the pines and podocarps as an indication of the probable affinity of the two groups. This view is no longer tenable, since the wings of the pollen in the latter are a development within the group itself, analogous but not homologous with those of the pine series. On the contrary, the relationship of the microgametophytic condition in the Podocarpeae to that in the Araucarieae is increasingly apparent.—ROBERT BOYD THOMPSON, *University of Toronto.*